

REMARKS

Claims 1-30 and 51-60 are pending in the present application. Claims 1, 16, and 19 have been amended, claims 31-50 have been cancelled, and claims 51-60 have been added as the result of this response. Claims 1, 16, and 19 are independent claims.

ELECTION/RESTRICTION

Applicants confirm election of the Group I invention, including claims 1-30. Applicants have cancelled claims 31-50, which are directed to the Group II invention and added new claims 51-60, which further define example embodiments of the Group I invention. Applicants respectfully request examination and allowance of claims 1-30 and 51-60, all directed to the Group I invention.

INFORMATION DISCLOSURE STATEMENT

Applicants direct the Examiner's attention to an Information Disclosure Statement filed concurrently herewith. Consideration of the publications enclosed herewith and indication thereof on an initialed and signed PTO-1440 Form is respectfully requested.

DRAWINGS

The Examiner asserts that Figures 2, 3a-3b and possibly Figures 4 and 10 should be designated by a legend such as "Prior Art". Although Applicants do not admit that the subject matter of Figures 2, 3a-3b, 4, and 10 is prior art, Applicants acknowledge that the teachings illustrated in these figures may have preceded the filing date of the present application. Accordingly, the Applicants direct the Examiner's attention to the replacement figures for Figures 2, 3a-3b, 4 and 10, in which these figures are labeled "Conventional Art". In light of the replacement sheets, Applicants request withdrawal of this objection.

EXAMPLE EMBODIMENTS OF THE PRESENT INVENTION

Example embodiments of the present invention are illustrated in Figs. 8A, 9A, and 11, and generally recited in independent claims 1, 16, and 19. Independent claim 1 recites a method of removing a photoresist from a substrate which includes treating the photoresist with a first reactant (for example, supercritical carbon dioxide (SCCO₂)) to cause swelling, cracking, or delamination of the photoresist, treating the photoresist with a second reactant (for example, an ozone-based reactant, such as ozone vapor or ozone gas mixed with water vapor), and removing the chemically altered photoresist with a third reactant (for example, deionized water).

Independent claim 16 recites treating the photoresist with supercritical SCCO₂, treating the photoresist with an ozone-based reactant, and removing the photoresist with deionized water.

Independent claim 19 recites loading the substrate into a chamber, injecting a first reactant (for example, carbon dioxide) into the chamber and converting the first reactant (carbon dioxide) to supercritical conditions, maintaining contact between the substrate and the supercritical first reactant, depressuring the chamber, injecting a second reactant (for example, an ozone-based reactant), into the chamber, maintaining contact between the substrate and the second reactant, purging the chamber and unloading the substrate, removing the photoresist, and drying the substrate.

35 U.S.C. § 102(e) VAARTSTRA REJECTION

Claims 1-2, 4-9, 13-15, 19, 21-23, and 29-30 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 6,770,426 to Vaartstra. This rejection, insofar as it pertains to the currently pending claims, is respectfully traversed for the following reasons.

In formulating the rejection of independent claims 1 and 19, the Examiner asserts that col. 5, lines 55-56 of Vaartstra teach treating a photoresist with supercritical carbon dioxide. The Examiner further asserts that col. 5, line 32 of Vaartstra teaches treating a photoresist with a second reactant, for example, ozone. The Examiner further asserts that col. 5, lines 43-44, and col. 5, line 56 of Vaartstra teach removing a chemically-altered photoresist with a third reactant, relying on the "one or more additional components" of col. 5, lines 43-44 of Vaartstra.

Applicants assert Vaartstra discloses two specific **composition** embodiments. The first composition embodiment, described from col. 3, line 66 to col. 4, line 4, includes at least one component in a supercritical state, where the at least one component is an oxidizer. In this embodiment, Vaartstra discloses the at least one component may be selected from the group of SO₃, SO₂, N₂O₂, NO, NO₂, O₃, H₂O₂, F₂, Cl₂, BR₂, and O₂.

The other main embodiment disclosed in Vaartstra, described from col. 3, lines 44-50, indicates the composition includes a supercritical component in a supercritical state, wherein the supercritical component is selected from the group of CO₂, NH₃, H₂O, N₂O, CO, N₂, He, Ne, Ar, Kr, and Xe. In this embodiment, the composition further includes an oxidizer, not in a supercritical state, wherein the oxidizer is selected from the same list of oxidizers set forth above, namely SO₃, SO₂, N₂O, NO, NO₂, O₃, H₂O₂, F₂, Cl₂, BR₂, and O₂.

As can be clearly seen from the above, Vaartstra discloses **compositions**, which clearly indicate that the first reactant, second reactant, and/or third reactant of Vaartstra (if three in fact, do exist) are all applied to the photoresist **at the same time, as part of the composition**.

In contrast, in example embodiments of the present invention, the first reactant, second reactant, and third reactant are applied to the photoresist **sequentially** (albeit in all different orders) or sequentially **in a specific order**.

Applicants respectfully submit that independent claims 1 and 19 are directed to distinct, sequential operations, which Vaartstra's **compositions** cannot provide. Accordingly, Applicants respectfully submit that independent claims 1 and 19 are patentable over Vaartstra, for at least this reason.

Applicants further respectfully submit that new claims 51-54 and 57-60 have been added, which are directed to distinct, sequential operations in a particular order, which Vaartstra's **compositions** also cannot provide. Accordingly, Applicants respectfully submit that dependent claims 51-54 and 57-60 are patentable over Vaartstra, for at least the reasons set forth above with respect to independent claims 1 and 19, respectively, and based on the features specifically recited therein.

Applicants respectfully submit that dependent claims 2, 4-9, 13-15, 21-23 and 29-30 are allowable by virtue of their dependency on allowable independent claims 1 or 19, for at least the reasons set forth above.

35 U.S.C. § 103(a) VAARTSTRA/LIU/SHIBATA REJECTION

Claim 3 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Vaartstra in view of two publications, namely Liu and Shibata. This rejection, insofar as it pertains to the presently pertains, is respectfully traversed for the following reasons.

Applicants respectfully submit that Liu and Shibata fail to make up for the deficiency discussed above with respect to Vaartstra and independent claim 1. Accordingly, Applicants respectfully submit that dependent claim 3 is allowable over this combination at least by virtue of its dependency on allowable independent claim 1, for the reasons set forth above.

Applicants further respectfully submit that the Examiner's rejection of claim 3 under 35 U.S.C. § 103(a) is deficient for failure to provide proper motivation for combining Vaartstra, Liu, and/or Shibata. Accordingly, Applicants respectfully submit that dependent claim 3 is allowable for this additional reason.

35 U.S.C. § 103(a) VAARTSTRA/TIPTON/MATSUDA REJECTION

Claims 7-10, 24, 27 and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Vaartstra in view of U.S. Patent 6,800,142 to Tipton et al. and U.S. Patent Publication 2004/0198627 to Matsuda et al. This rejection, insofar as it pertains to the presently pertains, is respectfully traversed for the following reasons.

Applicants respectfully submit that Tipton and Matsuda fail to make up for the deficiency discussed above with respect to Vaartstra and independent claims 1 and 19. Accordingly, Applicants respectfully submit that dependent claims 7-10, 24, 27 and 30 are allowable over this combination at least by virtue of their dependency on allowable independent claims 1 and 19, for the reasons set forth above.

Applicants further respectfully submit that the Examiner's rejection of claims 7-10, 24, 27 and 30 under 35 U.S.C. § 103(a) is deficient for failure to provide proper motivation for combining Vaartstra, Tipton, and/or Matsuda. Accordingly, Applicants respectfully submit that dependent claims 7-10, 24, 27 and 30 are allowable for this additional reason.

35 U.S.C. § 103(a) VAARTSTRA/MATSUDA REJECTION

Claims 11-12, 16-17 and 28 have been rejected under 35 U.S.C. § 103(a) as being unpatentable Vaartstra in view of Matsuda et al. This rejection, insofar as it pertains to the presently pertains, is respectfully traversed for the following reasons.

Applicants respectfully submit that Matsuda fails to make up for the deficiency discussed above with respect to Vaartstra and independent claims 1 and 19. Accordingly, Applicants respectfully submit that dependent claims 11-12, 16-17 and 28 are allowable over this combination at least by virtue of their dependency on allowable independent claims 1 and 19, for the reasons set forth above.

Applicants further respectfully submit that the Examiner's rejection of claims 11-12, 16-17 and 28 under 35 U.S.C. § 103(a) is deficient for failure to provide proper motivation for combining Vaartstra and Matsuda. Accordingly, Applicants respectfully submit that dependent claims 11-12, 16-17 and 28 are allowable for this additional reason.

35 U.S.C. § 103(a) VAARTSTRA/TIPTON/MATSUDA REJECTION

Claims 18, 20, 25-26 and 30 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Vaartstra in view of Tipton and Matsuda. This rejection, insofar as it pertains to the presently pertains, is respectfully traversed for the following reasons.

Applicants respectfully submit that Tipton and Matsuda fail to make up for the deficiency discussed above with respect to Vaartstra and independent claims 1 and 19. Accordingly, Applicants respectfully submit that dependent claims 18, 20, 25-26 and 30 are allowable over this combination at least by virtue of their dependency on allowable independent claims 1 and 19, for the reasons set forth above.

Applicants further respectfully submit that the Examiner's rejection of claims 18, 20, 25-26 and 30 under 35 U.S.C. § 103(a) is deficient for failure to provide proper motivation for combining Vaartstra, Tipton, and/or Matsuda. Accordingly, Applicants respectfully submit that dependent claims 18, 20, 25-26 and 30 are allowable for this additional reason.

CONCLUSION

In view of the above amendments and remarks, reconsideration of the various rejections and allowance of each of claims 1-30 and 51-60 is respectfully requested

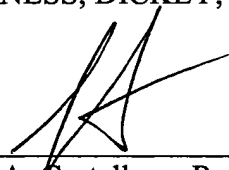
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John A. Castellano, Reg. No. 35,094 at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By



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